

temperature fell at nearly the adiabatic rate for dry air. The state of stable equilibrium below the inversion point would probably tend to confine the greater part of the dust to a stratum of air of limited depth.

The morning weather map of January 15 showed a trough-shaped low extending from British Columbia to Kansas, with the lowest sea level pressure, 29.35 inches, at Helena, Mont. The pressure was also low, 29.2 inches, over the Gulf of St. Lawrence. Between the two lows was a ridge of relatively high pressure extending from east of Winnipeg to the Gulf of Mexico. Temperatures in this HIGH were low, ranging from -10° F. north of the Great Lakes to 40° F. along the eastern Gulf coast. Cheyenne, Sheridan, Rapid City, and Denver reported temperatures close to 50° F. with wind velocities between 20 and 34 miles an hour. Stations in Iowa reported zero temperatures. There was, therefore, a difference in temperature between the eastern and western stations of about 50 degrees.

Kansas and the eastern half of Nebraska had received precipitation within the preceding 48 hours. Undoubtedly the ground was wet for several hundred miles west and southwest of the station. This condition would prevent the formation of dust in the vicinity of Drexel. It is believed that the high wind drove the dust into the air somewhere along the eastern slope of the Rocky Mountains, probably in Colorado or Wyoming. The altitude of Denver, Colo., is about 1,200 meters greater than that of Drexel. As the warm air flowed east along the gradient of the low it moved into a region of lower temperature. This condition compelled the warm west wind to blow above the colder south wind without mixing with the latter. The dust cloud, therefore, passed over this station at practically the same altitude above sea level as that at which it originated.

Such a condition is often observed in the lower strata at this station in connection with smoke clouds. It usually occurs as the lower wind blows from an easterly direction immediately after the passage of a high pressure area. Smoke from the city of Omaha, about 20 miles east-southeast of Drexel, can then be seen moving toward the station in a thin sheet a few hundred meters above ground. Kite flights made under these conditions always show a temperature inversion from the ground to some altitude above the upper surface of the smoke.

FURTHER EVIDENCE AS TO THE WESTERN ORIGIN OF DUST WHICH FELL IN CENTRAL STATES, FEBRUARY 12-15, 1919.

In an article on "The Great Cyclone of Mid-February, 1919," in the October MONTHLY WEATHER REVIEW (pp. 582-586) there was a brief discussion of the character of the dust collected at Des Moines, Iowa, samples of which had been examined by Mr. Jacques W. Redway of Mount Vernon, N. Y. Since the publication of that article, Mr. Redway has written to the author telling of further examinations which he has made. He says, in part: "It was not until I had received the last of half a dozen samples that I was enabled to designate its character. The last sample, which was coarse, showed that the substance was magnetic oxide of iron, Fe_3O_4 , and not metallic iron. In other samples the substance so closely resembled smelter dust that I was deceived. The dust was very clearly from the Rocky Mountains." The article above referred to stated that it was probable that the small iron particles were of local origin, perhaps from foundries in the vicinity.—C. L. M.

THE OBSERVATION OF DUST FALLS.

By ERIC R. MILLER.

[Presented before the American Meteorological Society, at Chicago, Dec. 28, 1920.]

[Author's abstract.]

Observation of the frequency and extent of dust falls and collection of the dust for examination are important services that the meteorologist can render the geologist, soil physicist, and plant pathologist.

Questionnaires sent out on the occasion of dust falls brought replies indicating that less than 10 per cent of the official and cooperative observers had noticed the dust.

This paper describes the appearance of rain and snow containing dust, and suggests methods of separating the dust without destroying living organisms, driving off volatile constituents, or contaminating the sample.

DISCOLORATION OF SNOW IN NORTHERN NEW YORK.

That the atmosphere in northern New York is very clean is proved by the pure whiteness of the snow, even after it has remained on the ground for a long time. At Alexandria Bay, where only hard coal is burned and there is no railroad closer than 6 miles and no factories closer than 30, there is no reason why the snow should be other than dazzling white. However, for all this, it has often come to my notice that there is a faint brownish tinge to the snows that come with the south and west winds when the temperature is near or a little above the freezing point, making a strong contrast with the extreme whiteness of the snows which are brought with the cold northerly and northeasterly winds. For instance, we will have a snow from the north, then a few days later there will be a rise in temperature with southerly or westerly winds, and with it snowfall. This snow has a dirty appearance as it lies upon the snow that fell before it. It is not always that snow with these winds is discolored. Is it not possible that the discoloration of the snow is due to the higher temperature at which it is formed? This brownish snow is generally in very large flakes and often mixed with snow pellets or soft hail (graupel), while the snow from the north is of finer texture and drier. As far as the eye can observe the brownish snow seems as clean as the other. I am curious to learn the cause of this phenomenon.—Douglas F. Manning.

DISCUSSION.

There would seem to be no reason to expect a difference in color on account of any difference in the crystals or the amount of water they may have. The most obvious explanation that suggests itself is that the smoke from the industrial cities south and southwest of Alexandria Bay makes the snow dirty, crystallization taking place perhaps directly on the smoke particles, and thus bringing them to the ground. On rare occasions the snow there may be discolored by dust carried from the Great Plains. A chemical analysis of this "dirty" snow would be interesting, and would reveal the cause of its discoloration.—EDITOR.

NOTE IN REGARD TO THE CLINGING QUALITIES OF SNOW.

Other things being equal, the clinging quality of snow will depend upon the form of the snowflake. This was exemplified at Binghamton, N. Y., on February 11, 1921.